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Home Economics

Alice P. Norton

Pedagogic School: The work of March will complete the course on food given to the training class. No attempt has been made to present a thorough course in cookery. The aim has been to illustrate principles, and to give to the students an insight into the subject which will enable them, if they choose, to do further study by themselves, and to enter into the work of the special teacher with whom they may be connected in their teaching.

The work for the latter part of February and the first of March will be on yeast bread, and baking-powder mixtures. Special topics will be assigned to different members of the class. The outline of work is as follows:

I. Yeast.

1. Definition:

A simple one-celled plant, of minute size, reproducing by means of budding.

2. Form and structure:

Oval in shape; consisting of a cell wall of cellulose filled with protoplasm.

3. Conditions favorable for growth.

(a) Moisture.

(b) Food: { Proteid. Mineral matter. Sugar.

(c) Temperature of 20° C. to 30° C. (68° F. to 86° F.).

4. Changes caused by growth.

Yeast is a ferment, and as a result of its life processes changes sugar into alcohol and carbon dioxide. In the process of bread-making starch is changed into sugar, and authorities differ as to whether this change is produced by means of the yeast, or by a ferment present in

the flour. The chemical reactions may be expressed as follows:

STARCH. WATER. SUGAR.

$C_6H_{10}O_5+H_2O=C_6H_{12}O_6$ (dextrose),

or or

$2\ C_6H_{10}O_5+H_2O=C_{12}H_{22}O_{11}$ (maltose).

DEXTROSE. ALCOHOL. CARBON DIOXIDE.

$C_6H_{12}O_6$ (+yeast)$=2\ C_2H_6O+2\ CO_2$

MALTOSE.

$C_{12}H_{22}O_{11}$(+yeast)$=4\ C_2H_6O+4\ CO_2$.

The souring of bread, that is, the change of alcohol into acetic acid, is produced by bacteria, not by yeast.

5. Kinds.

Yeasts in common use in bread-making are liquid, dried, and compressed yeasts. The last is a by-product of the whisky industry.

6. Experiments.

(a) Add to a cup of boiling water one tablespoon of molasses, and one-eighth of a yeast cake crumbled into bits, and pour the mixture into a tumbler. Add an equal amount of molasses and yeast to a tumbler of ice-water, and also to a tumbler of water at a temperature of 80° F. Notice the time when bubbles, indicating the formation of gas, appear in the liquid, and the comparative amount of gas formed. Which is the least favorable to the growth of the yeast, extreme heat or cold?

(b) Fill a test-tube with a mixture of molasses and water, and add a little yeast. Invert the test-tube in a saucer containing a little of the molasses mixture, support it in place, and leave for twenty-four hours. Identify the gas formed by bringing the mouth of the test-tube next the mouth of another tube containing lime-water; and by inserting a lighted match in the gas.

(c) Examine some yeast under the microscope.

II. Wheat.

1. Structure of wheat grain.

A section will be studied under the microscope to show the starch cells, the gluten cells, and the different layers of the bran.

2. Manufacture of flour from wheat, with a description of the milling processes.

3. Composition of flour.

Atwater gives as the average composition of one hundred samples: Water, 12.5%; proteid, 11.3%; fat, 1.1%; carbohydrates, 74.6%; mineral matter, 0.5%. The class have already determined roughly the composition by the following experiment: Weigh 50 grams of flour, tie it into a weighed square of cheese-cloth, and wash in water till nothing more can be washed out. Examine the tough, elastic substance which remains in the cloth. Dry this on the cloth and weigh it. The starch may also be dried and weighed.

4. Comparison of wheat flour with that from other grains, as a material for bread-making. Mix flour and water, corn-meal and water, rye flour and water, and compare the doughs formed. The gluten of the wheat gives the elasticity to the dough, and enables it to retain the bubbles of gas formed.

5. Comparative digestibility and nutritive value of white and whole-wheat flour.

III. Process of bread-making.

1. Comparison of long and short process. The former probably produces a more digestible loaf, but the latter is easier to watch, as to temperature, etc., and so less likely to sour. For class-room work the short process is best.

2. Rule.

Many different methods give good results.

The one given will be:

1 pint of liquid (milk, or milk and water).
1 tablespoon of butter.
1 tablespoon of sugar.
1½ teaspoon of salt.
1 yeast cake moistened with ¼ c. of water.

Flour to make a dough stiff enough to knead (about 6 cups).

Scald milk, add butter, sugar, and salt, and cool to 80° F., or until it feels cool to the finger. Break the yeast into bits, and mix it thoroughly with the water at a temperature of 80°; add to the milk, and stir in the flour gradually, with a knife or wooden spoon. When the dough is just stiff enough to make into a smooth ball, knead it on a slightly floured board till smooth and elastic. Return it to the mixing bowl, cover closely with a cloth and tin cover, and let it rise till double its bulk, keeping it at a temperature of about 75°. Shape into small loaves, place in the pans, cover, and let rise till it again doubles its bulk. Bake in a hot oven for about fifty minutes.

3. Discussion of reason for use of each material; essential and non-essential materials distinguished. Importance of temperature; reasons for baking.

II. Baking-powder mixture.

The class will be asked to look up the subject of baking powders, and to outline a lesson on the subject suitable for a class in the Seventh or Eighth Grade. The question of how much chemistry it is desirable to teach such a class will be discussed, and from a number of experiments suggested, those best adapted for the

pupils will be selected. The following week one member of the class will teach the lesson to the Seventh or Eighth Grade, while the other members will observe.

The rest of the month will be given chiefly to a discussion of methods of teaching, of the correlation of cooking with other subjects, and of the value of such work in the training of the pupil.

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Cooking in the Primary Grades

Flora J. Cooke

During this month but little actual cooking will be done, as another phase of school economics seems more important and essential to the children at this time.

The question will be the simple purification of water for drinking. They will attempt to make pure enough for drinking the water from the hydrant, and that which they bring home from the lake and the swamp. The same problem in another form will be presented during the month—i. e., to get sugar from maple sap. For this purpose they have as usable knowledge their observations in all the previous cooking lessons, their practical experiences at home, and many general observations in regard to moisture.

As a direct preparation for next month's work in planting the garden, the children will make a record of what they have observed concerning the absorption and evaporation of water. In this connection, to correct false impressions or clear up vague images, they may need to prepare and to cook again various foods used in previous months.

In the Third and Fourth Grades the children have already asked questions and made surmises which will make necessary some or all of the following experiments:

Number: Requiring work in volume, area, weight, time, and lines, in addition to subtraction, multiplication, division in whole numbers and fractions.

Evaporation: In the work in cooking last month the children discovered that when rice was soaked over night in a certain amount of water there was always some of the water which had not gone into the substance, for which they could not account. It was necessary to have enough water to cover the rice during the time it was soaking, and they could not estimate the necessary amount. This month we shall have the following explanatory experiments in evaporation. These will also give some useful data for their garden work in May.

Problem: What affects the rate of evaporation?

1. Series of simple experiments with two tin water vessels of equal size, placed under varying conditions.—Fill the vessels with water; weigh them. Close one of the vessels, leave one open. Place them in a warm, light place for a certain length of time; weigh again. Place in a cold, dark place. Place near the ceiling, near the floor, outdoors, etc., for the same length of time. Compare the results. What caused the differences observed?

2. Series of experiments with the following tin vessels, each having a capacity of 16 cubic inches, but of varying depths, shapes, and areas of exposed surface. Open surfaces of boxes: 4×4, 8×2, 16×1, 2×2, 8×1, 2×1, 2×4, 1×1, 1×2. Fill these with water and subject them in sets to the above conditions. In accounting for the differences noticed, it will be necessary for the children to find the contents of each box, the area of open surface, the relation of the open surfaces to each other, the weight of each before and after a certain period of evaporation. Record the conclusions made by the children. See if they use these results to explain what they tried to find out last month. How does it explain other things which they constantly see, as the drying of clothes, of the